United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-450/3-80-035b
October 1982

Air

EPA

Metal-Coil Surface-Coating Industry — Background Information for Promulgated Standards

Final EIS

EPA--450/3-80-035b

DE83 900199

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EPA-450/3-80-035b

Metal-Coil Surface-Coating Industry — Background Information for Promulgated Standards

Emission Standards and Engineering Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

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ENVIRONMENTAL PROTECTION AGENCY

Background Information
and
Final Environmental Impact Statement
for
Metal Coil Surface Coating Industry

Prepared by:

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10/21/82
(Date)

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1. The promulgated standards of performance would limit emissions of volatile organic compounds from new, modified, and reconstructed metal coil surface coating lines. Section 111 of the Clean Air Act (42 USC 7411), as amended, directs the Administrator to establish standards of performance for any category of new stationary sources of air pollution which ". . . causes or contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare." All regions of the United States would be affected by these standards.

2. Copies of this document have been sent to the Department of Labor; Department of Agriculture; Department of Commerce; Office of Management and Budget; Council of Environmental Quality; members of the State and Territorial Air Pollution Program Administrators, and the Association of Local Air Pollution Control Officials; EPA Regional Administrators; and other interested parties.

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4. Copies of this document may be obtained from:

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1. SUMMARY

On January 5, 1981, the U.S. Environmental Protection Agency (EPA) proposed standards of performance for metal coil surface coating operations (45 FR 1102) under authority of Section 111 of the Clean Air Act. Public comments were requested on the proposal in the Federal Register. There were seven commenters, composed mainly of coil coaters and coating manufacturers. Also commenting were the Ohio Environmental Protection Agency and the U.S. Department of the Interior. Two presentations were made at the public hearing on February 4, 1981. The comments that were submitted, along with responses to these comments, are summarized in this document. The summary of comments and responses serves as the basis for the revisions made to the standards between proposal and promulgation.

1.1 SUMMARY OF CHANGES SINCE PROPOSAL

Significant changes in the standards since proposal involve compliance and reporting procedures. Specifically, a procedure was added to the compliance provisions by which coil coaters can compute a monthly emission limit for affected facilities that control emissions by the combined use of low-solvent technology and higher solvent coatings with a control device. In addition, reporting of monthly performance test data has been dropped from the standards, but owners and operators are required to record and maintain these data.

1.2 SUMMARY OF IMPACTS OF PROMULGATED ACTION

1.2.1 Alternatives to Promulgated Action

The regulatory alternatives are discussed in Chapter 6 and Appendix E of the background information document (BID) for the proposed standards. These regulatory alternatives reflect the different levels of emission control, from which one is selected that represents the best demonstrated technology, considering costs, nonair quality health, and environmental and

economic impacts for metal coil surface coating. These alternatives remain the same.

1.2.2 Environmental Impacts of Promulgated Action

Environmental impacts are discussed in Chapter 7 and Appendix E of the proposal BID. These impacts remain unchanged.

1.2.3 Energy and Economic Impacts of Promulgated Action

Energy and economic impacts are discussed in Chapters 7 and 8 and Appendix E of the proposal BID. These impacts remain unchanged.

1.2.4 Other Considerations

1.2.4.1 Irreversible and Irretrievable Commitment of Resources. Chapter 7 of the proposal BID contains a discussion of irreversible and irretrievable commitment of resources. These impacts remain unchanged.

1.2.4.2 Environmental and Energy Impacts of Delayed Standards. Chapter 7 of the proposal BID contains a discussion of the environmental and energy impacts of delayed standards. These impacts remain unchanged.

2. SUMMARY OF PUBLIC COMMENTS

Table 2-1 shows the list of commenters, their affiliations, and the U.S. Environmental Protection Agency (EPA) docket number assigned to each of their comments. Six letters commenting on the proposed standards and the background information document (BID) for the proposed standards were received. The significant comments have been combined into the following categories:

1. General
2. Emission control technology
3. Environmental impact
4. Legal considerations
5. Test methods and monitoring.

The comments, issues, and their responses are discussed in the following sections of this chapter. A summary of the changes to the standards is included in Section 1.2 of Chapter 1.

2.1 GENERAL

2.1.1 Comment: Two commenters (IV-F-1a, IV-D-5) questioned the need for a new source performance standard (NSPS) for coil coating, stating that, for economic reasons, new coil coating lines already employ the best technology for capturing VOC emissions to burn as fuel for their ovens and, therefore, do not contribute significantly to VOC emissions nationwide. They also questioned EPA's determination that coil coating contributes significantly to air pollution.

Response: Section 111 of the Clean Air Act requires EPA to promulgate NSPS's for all source categories that contribute significantly to harmful air pollution [Section 111(b)(1), (f)(1)]. Metal coil coating is such a category [40 CFR 60.16 (Source Category No. 22); 44 FR 49222 (August 21, 1979)].

TABLE 2-1. LIST OF COMMENTERS ON THE PROPOSED STANDARDS FOR THE METAL COIL SURFACE COATING INDUSTRY

Docket number	Commenter and affiliation
IV-D-1	Cecil S. Hoffman U.S. Department of the Interior Office of the Secretary Washington, DC 20240
IV-D-2	J. V. Day Kaiser Aluminum and Chemical Corporation 300 Lakeside Drive Oakland, California 94643
IV-D-3 IV-F-1b	Jack Bates DeSoto, Incorporated 1700 South Mount Prospect Road Des Plaines, Illinois 60018
IV-D-4	James F. McAvoy, Director State of Ohio Environmental Protection Agency 361 East Broad Street Columbus, Ohio 43216
IV-D-5	Lawrence C. Tropea, Jr. Director of Environmental Control Reynolds Metals Company Richmond, Virginia 23261
IV-D-6	F. N. Mudge Vice President—Technology Anaconda Aluminum Company Louisville, Kentucky 40202
IV-F-1a	Frank Graziano Chairman, Technical Committee National Coil Coaters Association 2300 East Pratt Boulevard Elk Grove Village, Illinois 60007

EPA recognizes that the recent trend in the coil coating industry has been toward the use of incineration with heat recovery as an energy conserving and economically attractive operating setup. EPA appreciates the emission reduction that has been achieved by this trend; however, promulgation of an NSPS is necessary to ensure that emission reductions reflecting best demonstrated technology (BDT) are achieved.

2.1.2 Comment: One commenter (IV-F-1a) stated that EPA regulations covering VOC emissions from metal surface coating operations are inequitable in that the emission limits proposed for coil coating are more stringent than the limits proposed for other metal coating operations.

Response: Section 111 requires that each NSPS reflect BDT for that source category. EPA uses the same approach in evaluating BDT for different source categories. The fact that the resulting emission limits are different for different source categories is irrelevant ["Portland Cement Association v. Ruckelshaus," 486 F.2d 375, 389 (D.C. Cir. 1973); "National Lime Association v. EPA," 627 F.2d 416, 447 n. 108 (D.C. Cir. 1980)].

2.1.3 Comment: One respondent (IV-F-1a) commented that the projected growth of coil coating used in the background study (12 percent per year) is too high and that a rate of 8 to 10 percent is more realistic.

Response: The 12-percent per year growth rate mentioned in the background study is a misstatement of the growth rate used in the analyses. Total coating capacity was estimated to increase by a constant amount each year over a 5-year period. The increase used was equal to 12 percent of the total industry capacity in the baseline year. This is not equal to a 12-percent annual growth rate. Stated on a percentage basis, the annual growth rates assumed were 12 percent the first year, 10.7 percent the second year, 9.8 percent the third year, 9.0 percent the fourth year, and 8.5 percent the fifth year. Over the 5-year period, the average annual growth rate was approximately 10 percent per year. This growth rate is within the range of the growth rate values suggested by the commenter, and, therefore, EPA concludes that the projections in the background study are reasonable.

2.1.4 Comment: One commenter (IV-F-1b) stated that he was unsure whether or not the standards permit a coater to use low VOC-content coatings that

have a VOC content greater than 0.28 kilograms per liter (kg/ℓ) of coating solids in conjunction with other lower VOC-content coatings and to comply by computing the weighted average of the VOC contents.

Response: The standards state that an affected facility is in compliance if each coating used has a VOC content less than or equal to 0.28 kg/ℓ of coating solids or if the volume weighted average VOC content of all coatings used in a calendar month is less than or equal to 0.28 kg/ℓ of coating solids. A procedure for computing the volume weighted average VOC content is provided in the standards. EPA considers that the concerns of the commenter are clearly covered in the standards as written and, therefore, made no changes to the wording of the standards in response to this comment.

2.1.5 Comment: One public hearing participant (IV-F-1b) stated that the definition of "affected facility" should be changed from each coating operation to an entire coating line to permit averaging of the two coating operations on a tandem coil coating line. The public hearing participant later submitted this comment in a letter (IV-D-3).

Response: The choice of the affected facility for these standards is based on the Agency's interpretation of Section 111 of the Act and judicial construction of its meaning. Under Section 111, the NSPS must apply to "new sources"; "source" is defined as "any building, structure, facility, or installation which emits or may emit any air pollutant" [Section 111(a)(3)]. Most industrial plants, however, consist of numerous pieces or groups of equipment that emit air pollutants and that might be viewed as "sources." EPA therefore uses the term "affected facility" to designate the equipment, within a particular kind of plant, chosen as the "source" covered by given standards.

In choosing the affected facility, EPA must decide which pieces or groups of equipment are the appropriate units for separate emission standards. The Agency must do this in light of the terms and purpose of Section 111. One major consideration is that the use of a narrower definition results in bringing replacement equipment under the NSPS sooner. For example, if an entire plant were designated as the affected facility, no part of an existing plant would be subject to the standards unless the plant as a whole were "modified." If, on the other hand, each piece of

equipment were designated as an affected facility, then, as each piece is replaced, it would be a new source subject to the standards. Because the purpose of Section 111 is to minimize emissions by the application of BDT (considering cost, other health and environmental effects, and energy requirements) at all new and modified sources, there is a presumption that a narrower designation of the affected facility is proper. This ensures that new emission sources would be subject to the standards as they are installed. This presumption can be overcome, however, if the Agency concludes that relevant statutory factors (technical feasibility, cost, energy, and other environmental impacts), point to a broader definition.

Designation of an entire coil coating line or an entire plant as an affected facility was considered in the development of the standards. These options were rejected in favor of designating each coating operation as an affected facility. In addition to the advantages cited above, this designation also simplifies recordkeeping and enforcement activities and, in many cases, gives added flexibility to owners or operators by allowing them to use different control technologies on each coating operation without the need for complicated averaging calculations.

2.1.6 Comment: One commenter (IV-D-6) stated that the definition of "coil coating" is too broad and would result in the regulation of many operations not considered in the development of the standards. The commenter suggested that the definition of "coil coating" be modified to exclude operations that process only metal with thicknesses less than 0.178 mm (0.007 in.), commonly considered to be metal foil, and to exclude operations covered by the proposed NSPS for can coating.

Response: Metal foil is defined by the Aluminum Association as metal strip with a thickness less than 0.152 mm (0.006 in.). While metal foil fits the definition of metal coil contained in the proposed standards (i.e., a continuous metal strip packaged in a roll or coil), coating formulations, application rates, emissions, and process operations for foil are quite different from those for coil. In the background study for the coil coating standards, EPA did not evaluate foil processing operations nor identify BDT. Foil processing is therefore excluded from coverage under the coil coating standards. EPA has, therefore, modified the definition of "coil coating" to exclude operations that process only metal with a thickness

less than 0.152 mm (0.006 in). This cutoff point is based on the formal definition of "foil products" that is used by the aluminum industry and that was communicated to EPA by the Aluminum Association and verified by a major producer of foil products. EPA could find no basis for selecting 0.178 mm (0.007 in.) as the point of differentiation as suggested by the commenter. The comment regarding operations covered by the coil coating standards that are also covered by the can coating standards reflects a misinterpretation of the coverage of the standards. Coil coating of can stock is covered by the coil coating standards but is excluded from coverage by the can surface coating standards.

2.1.7 Comment: One public hearing participant (IV-F-1b) commented that affected facilities where waterborne coatings are used for a significant portion of the time, but where solvent-borne coatings are also used, should be allowed to meet the waterborne emission limit when waterborne coatings are used and the emission limit for solvent-borne coatings and a control device for the remainder of their coating operations. This method of compliance is not allowed by the proposed standards.

Response: The few coil coating lines that are the basis for the comment use waterborne coatings for 80 to 90 percent of their coating operations and solvent-borne coatings for the remainder of the time. Incinerators for these lines are designed for operation only when solvent-borne coatings are used and do not have heat recovery facilities. Where such incinerators are used to reduce emissions from waterborne coatings, previous EPA analyses indicate that energy costs are very high because of the required use of a large quantity of supplemental fuel and that emission reductions are small because of the low VOC concentration in the exhaust stream. The costs per unit of emission reduction achieved become exorbitant under these circumstances. Consequently, a procedure was added to the promulgated standards by which coil coaters can calculate an emission limit each month based on the relative amounts of coatings used with and without the emission control device in operation. Operators can then comply with the calculated emission limit, which will have a value between 0.14 (or a 90-percent emission reduction) and 0.28 kg VOC/ℓ of coating solids applied, by the combination of waterborne coatings and solvent-borne coatings with a capture system and control device.

Two approaches were considered for this provision. Under the first approach (the one incorporated), owners or operators compute an affected facility's monthly emission limit, weighted according to the coating solids applied with each control technology, and then compute actual monthly emissions to determine compliance. Under the second approach, each affected facility would be required to achieve compliance with the emission limit for low VOC-content coatings (0.28 kg VOC/ℓ of coating solids applied) during the portion of the month when these coatings are used, and would be required to achieve compliance with the emission limit for higher VOC-content coatings and a control device (0.14 kg VOC/ℓ of coating solids applied, or a 90-percent emission reduction) for the portion of the month when this system is used.

The second approach has a disadvantage relative to the first one in that the averaging time over which compliance must be demonstrated may range from 1 day (or less) to a calendar month (~30 days). The established emission limits are based on a calendar month averaging time to allow owners or operators the flexibility of using coatings with a wide range of VOC content, which is very common in the industry, and still achieve compliance on a monthly basis. If the averaging time is reduced to less than a calendar month, the data may not support the emission limits now specified. In view of this disadvantage, the first approach was incorporated into the standards. The number of installations to which this provision applies is quite small, but the provision was determined necessary to allow particular installations to continue with their normal operating patterns.

2.2 EMISSION CONTROL TECHNOLOGY

2.2.1 Comment: One public hearing participant (IV-F-1a) and one commenter (IV-D-5) stated that the emission limit for low VOC-content coatings contained in the proposed standards, 0.28 kg VOC/ℓ of coating solids applied, is too stringent and would stifle research and development activities in low-solvent technology. It was further stated that the emission limit in the proposed standards was based mainly on coatings applied to architectural and building products and that the technology was

not demonstrated for all applications. Particular reference was made to the coating of can-end stock as requiring a separate emission limit for low-solvent technology.

Response: EPA believes that the data obtained during the background study adequately demonstrate the availability of waterborne coatings that will meet the proposed emission limits for most applications. EPA did not identify any low VOC-content coatings applicable for coil coating can-end stock and does not know of any now in use. The coil coating lines identified during the background study that coat can-end stock all use solvent-borne coatings. In recent discussions, several coating manufacturers stated that they are now working on the development of waterborne coatings for can-end stock and that the operating requirements for this application pose difficult problems in reducing the VOC content of the coatings. Reasons cited for these problems include the limitations established by the U.S. Food and Drug Administration on the ingredients that can be used in such coatings and the severe stress that the coatings must withstand during the can-end forming process.

Some coating manufacturers have indicated that coatings for can-end stock with a VOC content in the range of 0.4 to 0.5 kg/ℓ of coating solids may become available within the next few years, but they do not expect the levels of VOC content to be much below this range. Emissions from such coatings would be substantially greater than emissions from other coil coating operations that use either low VOC-content coatings or higher VOC-content coatings and incineration.

Because the use of higher VOC-content coatings with a control device has been determined to be technically and economically feasible and not exorbitantly costly, EPA has not established a separate emission limit for coil coating of can-end stock.

2.2.2 Comment: One commenter (IV-F-1a) suggested that, instead of placing stringent emission limits on coil coaters, EPA should require other metal surface coating operations to change to the use of precoated coil as a more environmentally favorable process.

Response: EPA has identified BDT (considering cost, other health and environmental effects, and energy requirements) for each metal surface

coating operation and has based the standards for each operation on that technology. The Agency believes that this procedure is consistent with the provisions of Section 111 of the Clean Air Act. This comment addresses other surface coating NSPS's and does not question or cast any doubt on the appropriateness of the coil coating NSPS; therefore, no changes have been made as a result of this comment.

2.2.3 Comment: One commenter (IV-D-5) suggested that the proposed standards incorrectly emphasize the installation of incinerators over the use of low-solvent technology and stated that EPA did not consider low-solvent technology in the development of the standards. The commenter further stated that the energy analysis was flawed by incorrect assumptions related to coater room exhausts.

Response: These comments were originally submitted at the National Air Pollution Control Techniques Advisory Committee (NAPCTAC) meeting in June 1980 and were resubmitted along with additional comments relating to the proposed standards. Subsequent to the NAPCTAC meeting and prior to proposal, EPA made changes to the standards in response to these comments. Several additional regulatory alternatives were evaluated, and separate provisions were added to the standards relating to the use of low-solvent technology. As proposed, the standards allow compliance by either low-solvent technology or incineration. The comment regarding consideration of low-solvent technology is therefore not applicable. Changes were also made to the provisions relating to coating rooms. As a result, the coater room exhaust is no longer required to enter the oven or control device. The energy-related comment referring to the coater room exhaust requirement also no longer applies. EPA therefore believes that an adequate response has been made to these comments and that they do not pertain to the proposed standards.

2.3 ENVIRONMENTAL IMPACT

2.3.1 Comment: One commenter (IV-D-5) stated that the draft environmental impact statement (EIS) in the proposal BID may understate final emission levels by a factor of 2 because incinerators are only capable of achieving a 90-percent reduction in VOC emissions rather than the 95 percent reduction assumed in the development of the draft EIS.

Response: EPA believes that the emission test data presented in the proposal BID adequately demonstrate the ability of incinerators to reduce emissions by 95 percent when operated at a temperature of 760° C (1,400° F) or more. This conclusion is based on emission tests at four plants where the incinerators were operated at 760° C (1,400° F) or greater and that achieved an emission reduction of 95 percent or greater and on tests at a fifth plant where an emission reduction of 95 percent or more was achieved at temperatures below 760° C (1,400° F). These data are itemized in Chapter 4 of the proposal BID.

2.4 LEGAL CONSIDERATIONS

2.4.1 Comment: One commenter (IV-D-5) stated that EPA's raw data base for the proposed standard is inadequate and was not based on Reference Method 25 testing.

Response: The standards are based on the Reference Method 25 test conducted by EPA during the background study. This test showed a 95-percent reduction across the incinerator at a temperature of 760° C (1,400° F). During that test, a continuous flame ionization detector (FID) was also used to measure VOC concentration in the incinerator outlet. The FID measurements consistently showed an emission reduction of approximately 99 percent at 760° C (1,400° F). There are other test data available that were obtained with an FID. In all these tests where the incinerator was operated at 760° C (1,400° F) or greater, the FID data consistently show an emission reduction of approximately 99 percent. These other data reinforce the validity of selecting 95 percent as the standard based on Reference Method 25 measurements.

2.5 TEST METHODS AND MONITORING

2.5.1 Comment: One commenter (IV-D-2) believes that Reference Method 25 is inappropriate as the only method for compliance testing because it is virtually unavailable to any source outside the Los Angeles area, where the air pollution control district owns the equipment and performs the tests, or outside the service area of a single commercial laboratory in the Midwest capable of carrying out the technique.

Response: There are at least five commercial laboratories in the Midwest and Northeast that are capable of performing compliance tests using Reference Method 25. Most of these laboratories are capable of supplying testing services to any region of the country.

2.5.2 Comment: One commenter (IV-D-2) stated that Reference Method 25 is highly laboratory oriented and requires extensive capital investment if individual sources must prepare to carry out the testing procedure. This commenter further stated that Reference Method 25 is subject to criticism for potential bias; that no suppliers exist for an instrument to handle analyses of Reference Method 25 test samples; and that, while one U.S. company has offered an instrument for sale, it has not performed reliably.

Response: At least one company has already built a prototype instrument, which has functioned reliably as the nonmethane organic analyzer described in Reference Method 25. In addition, there are now a number of commercial laboratories capable of supplying this service.

2.5.3 Comment: One commenter (IV-D-2) was particularly concerned with the inability of Reference Method 25 to account for the bias that can be introduced by particulate matter, such as a flake of paint or a droplet of condensed hydrocarbon.

Response: Although organic particulate matter could be a potential problem if it were collected in the Reference Method 25 sampling train, this can be easily prevented by including a filter in the sample train upstream of the cold traps. Using a filter is an option that is permitted in Reference Method 25.

2.5.4 Comment: One commenter (IV-D-2) believes that alternative test procedures are available by which direct measurement can be made of total gaseous organic compounds with an FID. This method has adequately demonstrated the ability to monitor emissions on a real-time basis--an ability particularly important for cyclic processes or those that do not emit a uniform level of pollutants. The commenter, therefore, urged that the Agency consider substituting a more suitable method or, at least, providing for one or more alternative methods. The commenter offered to provide documentation and detail of the method considered superior and practical.

Response: EPA is presently developing a procedure using a flame ionization analyzer that may be used as an alternative method in certain cases. It will be permitted as an alternative procedure for determining the efficiency of control devices on coating operations if the analyzer is calibrated with the solvent material used in the coating process. This procedure will be available for use as an alternative procedure as soon as it is published in the Federal Register in its final form and the necessary changes have been made in the appropriate regulations.

In the meantime, one can apply under §60.8(b) for alternative method status. All that is required is that one submit a detailed written procedure for the candidate method comparing the candidate method and the reference method.

2.5.5 Comment: A comment received during the development of another surface coating standard questioned the relationship of the proposed standards and the use of reference Method 24 for determining compliance. The commenter stated that the proposed standards should include a "cushion" that would allow for differences in test results caused by variations in the three experimentally determined parameters used to calculate VOC content of coatings.

Response: Upon evaluation, EPA determined that this comment is equally applicable to the coil coating regulation.

EPA recognizes the potential variability in the results when Reference Method 24 is used to analyze water-based coatings. The method itself contains a procedure to account for this variability. The promulgated standards require that, when Reference Method 24 results are used to determine compliance, they be adjusted as described in Section 4.4 of Reference Method 24. This adjustment applies only to waterborne coatings.

If the actual VOC level of a waterborne coating is at or below the standard, there is less than 1 chance in 10,000 that the Reference Method 24 adjusted results will show the VOC level to be above the standard.

2.5.6 Comment: One commenter (IV-F-1a) challenged the use of the terms "total enclosure" and "total capture of VOC emissions" in the proposed test procedure for incinerators, stating that there is no such thing as total enclosure and total capture.

Response: EPA agrees that, taken literally, the terms "total enclosure" and "total capture of VOC emissions" describe conditions that are extremely difficult to achieve. Although these terms were used in a practical engineering sense, a literal interpretation could lead to both compliance and enforcement difficulties. In view of this possibility, EPA has changed the wording of the test procedure to eliminate the two terms and has replaced them with a requirement that coating station enclosures be maintained at a negative pressure to achieve good capture of VOC emissions.